

CLAIMS:

1. An expansion bolt comprising:

a cable;

an inner chock connected to an end of said cable having at least a

5 first outer ramping surface and a second outer ramping
surface;

at least two outer chocks having respective inner ramping surfaces
complementarily corresponding to said first and second
outer ramping surfaces respectively, said outer chocks

10 being adapted for relative movement along a longitudinal
axis of said cable with respect to said inner chock over a
predetermined range wherein, in a first direction of said
movement, the respective inner and outer ramping surfaces
slidably cooperate to radially expand the expansion bolt

15 and, in an opposite direction of said movement, the
respective inner and outer ramping surfaces permit radial
contraction of the expansion bolt; and

a compression spring for biasing said outer chocks with respect to
said inner chock in said first direction.

2. The expansion bolt of claim 1, wherein said outer chocks have respective
substantially cylindrical outer surfaces for making contact with the interior surface of a
5 round hole.

3. The expansion bolt of claim 1, further comprising a cleaning bushing
slidably received on said cable so as to make contact, at a distal-most position of said
cleaning bushing, with a proximal face of said inner chock.

4. The expansion bolt of claim 3, further comprising a collar slidably
10 received on said cable, said cleaning bushing being disposed between said collar and said
inner chock, said compression spring bearing on said collar, said collar supporting said
outer chocks via respective flexible control cables attached to said collar.

5. The expansion bolt of claim 2, wherein said outer surfaces of said outer
chocks each include respective slip-resistant gripping patterns for increasing the slip-
15 resistance of said outer chocks with respect to the hole when the expansion bolt is
inserted and expanded therein.

6. The expansion bolt of claim 5, further comprising a cleaning bushing slidably received on said cable so as to make contact, at a distal-most position of said cleaning bushing, with a proximal face of said inner chock.

7. The expansion bolt of claim 6, further comprising a collar slidably received on said cable, said cleaning bushing being disposed between said collar and said inner chock, said compression spring bearing on said collar, said collar supporting said outer chocks via respective flexible control cables attached to said collar.

8. The expansion bolt of claim 5, wherein said gripping patterns include a plurality of grooves and corresponding ridges.

10 9. The expansion bolt of claim 5, wherein about 50% of said outer surfaces includes raised portions and about 50% of said outer surfaces includes relatively depressed portions.

10. An expansion bolt, comprising:

a cable;

an inner chock connected to an end of said cable having an outer
ramping surface; and

at least one outer chock having an inner ramping surface
complementarily corresponding to said outer ramping
surface, said at least one outer chock being adapted for
relative movement along a longitudinal axis of said cable
with respect to said inner chock over a predetermined range
wherein, in a first direction of said movement, said inner
and outer ramping surfaces slidably cooperate to radially
expand the expansion bolt and, in an opposite direction of
said movement, said inner and outer ramping surfaces
permit radial contraction of the expansion bolt, said at least
one outer chock having a substantially cylindrical outer
surface for making contact with the interior surface of a
round hole, said outer surface including a slip-resistant
gripping pattern for increasing the slip-resistance of said at
least one outer chock with respect to the hole when the
expansion bolt is inserted and expanded therein.

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11. The expansion bolt of claim 10, further comprising a cleaning bushing slidably received on said cable so as to make contact, at a distal-most position of said cleaning bushing, with a proximal face of said inner chock.

12. The expansion bolt of claim 11, further comprising a collar slidably received on said cable, said cleaning bushing being disposed between said collar and said inner chock, said compression spring bearing on said collar, said collar supporting said outer chocks via respective flexible control cables attached to said collar.

13. The expansion bolt of claim 10, wherein said gripping patterns include a plurality of grooves and corresponding ridges.

10 14. The expansion bolt of claim 10, wherein about 50% of said outer surface includes raised portions and about 50% of said outer surface includes relatively depressed portions.

15. An expansion bolt comprising:

a cable;

an inner chock connected to an end of said cable having at least a
first outer ramping surface;

at least one outer chock having an inner ramping surface
complementarily corresponding to said first outer ramping
5 surface, said at least one outer chock being adapted for
relative movement along a longitudinal axis of said cable
with respect to said inner chock over a predetermined range
wherein, in a first direction of said movement, said inner
and first outer ramping surfaces slidably cooperate to
10 radially expand the expansion bolt and, in an opposite
direction of said movement, said inner and first outer
ramping surfaces permit radial contraction of the expansion
bolt; and

a cleaning bushing slidably received on said cable so as to make
15 contact, at a distal-most position of said cleaning bushing,
with a proximal face of said inner chock.

16. The expansion bolt of claim 15, wherein said at least one outer chock has a
substantially cylindrical outer surface for making contact with the interior surface of a

round hole, said outer surface of said at least one outer chock including a slip-resistant gripping pattern for increasing the slip-resistance of said at least one outer chock with respect to the hole when the expansion bolt is inserted and expanded therein.

17. The expansion bolt of claim 16, wherein said gripping pattern includes a
5 plurality of grooves and corresponding ridges.

18. The expansion bolt of claim 16, wherein about 50% of said outer surface of said at least one outer chock includes raised portions and about 50% of said outer surface of said at least one outer chock includes relatively depressed portions.

19. The expansion bolt of claim 15, wherein said inner chock has a second
10 outer ramping surface, further comprising at least one additional outer chock having an inner ramping surface complementarily corresponding to said second outer ramping surface, said at least one additional outer chock being adapted for relative movement along a longitudinal axis of said cable with respect to said inner chock over a predetermined range wherein, in a first direction of said movement, said inner ramping
15 surface of said at least one additional outer chock and said second outer ramping surface slidingly cooperate to radially expand the expansion bolt and, in an opposite direction of said movement, said inner ramping surface of said at least one additional outer chock and

said second outer ramping surface cooperate to permit radial contraction of the expansion bolt.

20. The expansion bolt of claim 19, wherein said at least one outer chock and said at least one additional outer chock have respective substantially cylindrical outer surfaces for making contact with the interior surface of a round hole, said outer surfaces including respective slip-resistant gripping patterns for increasing the slip-resistance of said at least one outer chock and said at least one additional outer chock with respect to the hole when the expansion bolt is inserted and expanded therein.

21. The expansion bolt of claim 20, wherein said gripping patterns each include a plurality of grooves and corresponding ridges.

22. The expansion bolt of claim 20, wherein about 50% of said outer surfaces of said at least one outer chock and said at least one additional outer chock include raised portions and about 50% of said outer surfaces of said at least one outer chock and said at least one additional outer chock include relatively depressed portions.